

TOSHIBA Photocoupler GaAs Ired & Photo-Triac

# TLP160J

Triac Drive

Programmable Controllers

AC-Output Module

Solid State Relay

The TOSHIBA mini flat coupler TLP160J is a small outline coupler, suitable for surface mount assembly.

The TLP160J consists of a photo triac, optically coupled to a gallium arsenide infrared emitting diode.

- Peak off-state voltage: 600 V (min.)
- Trigger LED current: 10 mA (max.)
- On-state current: 70 mA (max.)
- Isolation voltage: 2500 Vrms (min.)
- UL recognized: UL1577, file No. E67349

## Trigger LED Current

Classi- fication*	Trigger LED Current (mA)		Marking Of Classification
	V <sub>T</sub> =6V, Ta=25°C		
	Min.	Max.	
(IFT7)	—	7	T7
Standard	—	10	T7, blank

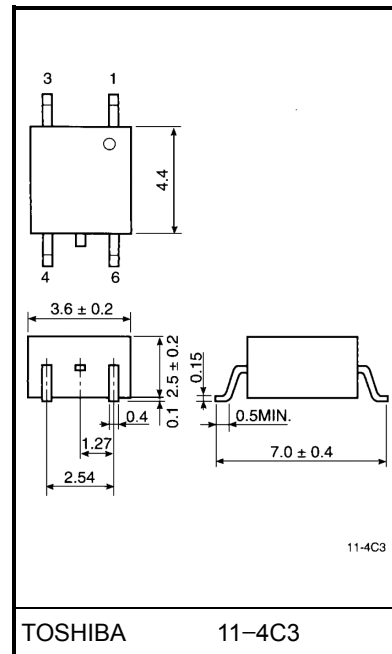
\*Ex. (IFT7); TLP160J (IFT7)

(Note) Application type name for certification test, please

use standard product type name, i.e.

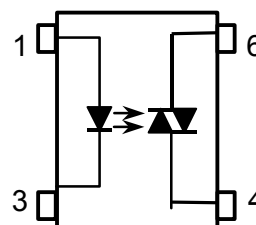
TLP160J (IFT7): TLP160J

Unit in mm



Weight: 0.09 g

## Pin Configurations



1. Anode
3. Cathode
4. Terminal 1
6. Terminal 2

**Maximum Ratings (Ta = 25°C)**

Characteristic			Symbol	Rating	Unit
LED	Forward current		I <sub>F</sub>	50	mA
	Forward current derating (Ta ≥ 53°C)		ΔI <sub>F</sub> / °C	−0.7	mA / °C
	Peak forward current (100 μs pulse, 100 pps)		I <sub>FP</sub>	1	A
	Reverse voltage		V <sub>R</sub>	5	V
	Junction temperature		T <sub>j</sub>	125	°C
Detector	Off-state output terminal voltage		V <sub>DRM</sub>	600	V
	On-state RMS current	Ta=25°C	I <sub>T(RMS)</sub>	70	mA
		Ta=70°C		40	
	On-state current derating (Ta ≥ 25°C)		ΔI <sub>T</sub> / °C	−0.67	mA / °C
	Peak on-state current (100μs pluse, 120pps)		I <sub>TP</sub>	2	A
	Peak nonrepetitive surge current (PW=10ms, DC=10%)		I <sub>TSM</sub>	1.2	A
	Junction temperature		T <sub>j</sub>	115	°C
Storage temperature range			T <sub>stg</sub>	−55~125	°C
Operating temperature range			T <sub>opr</sub>	−40~100	°C
Lead soldering temperature (10 s)			T <sub>sol</sub>	260	°C
Isolation voltage (AC, 1 min., R.H. ≤ 60%) (Note)			BV <sub>S</sub>	2500	Vrms

(Note) Device considered a two terminal device: Pins 1 and 3 shorted together and pins 4 and 6 shorted together.

**Recommended Operating Conditions**

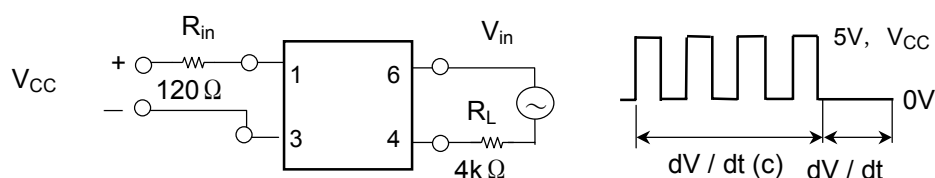
Characteristic	Symbol	Min.	Typ.	Max.	Unit
Supply voltage	$V_{AC}$	—	—	240	Vac
Forward current	$I_F$	15	20	25	mA
Peak on-state current	$I_{TP}$	—	—	1	A
Operating temperature	$T_{opr}$	-25	—	85	°C

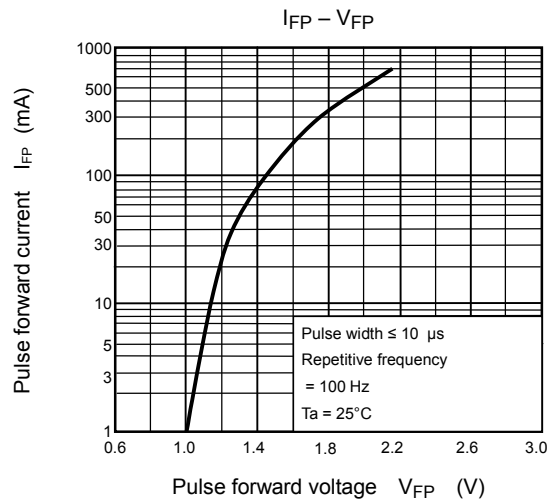
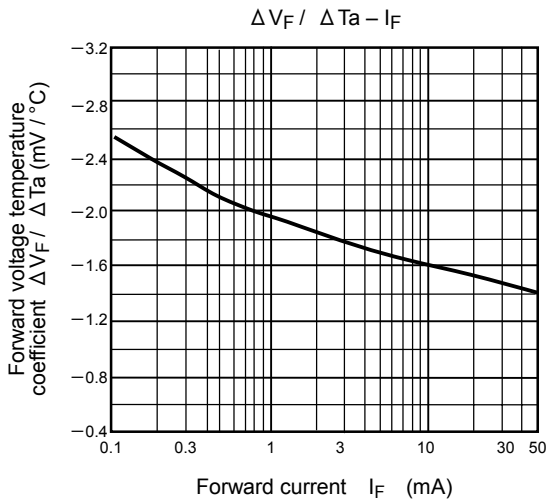
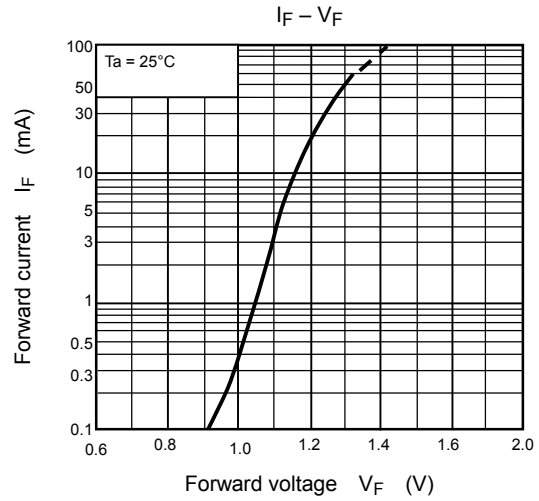
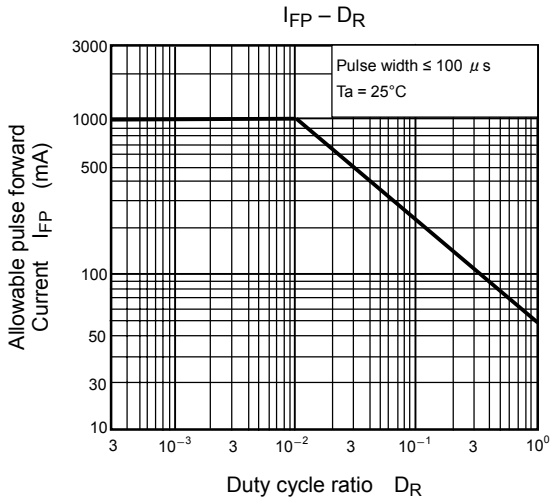
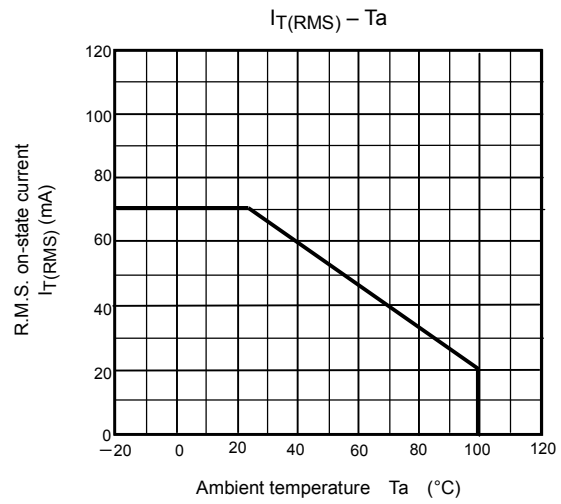
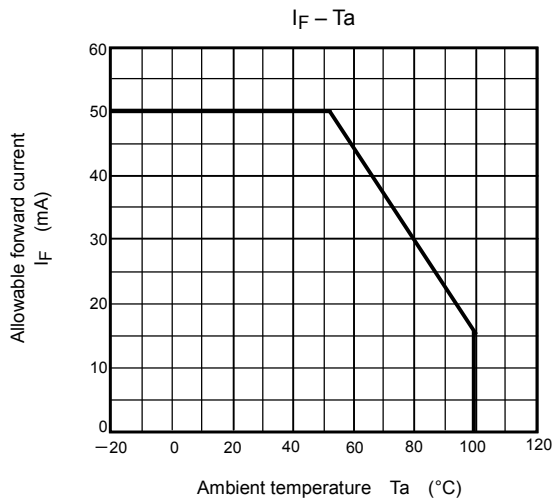
## Individual Electrical Characteristics (Ta = 25°C)

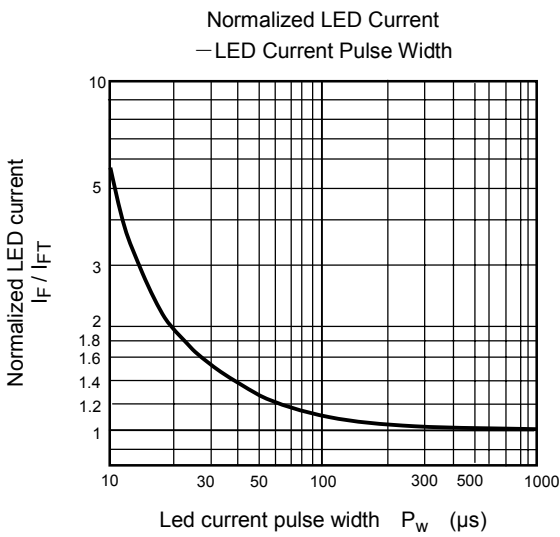
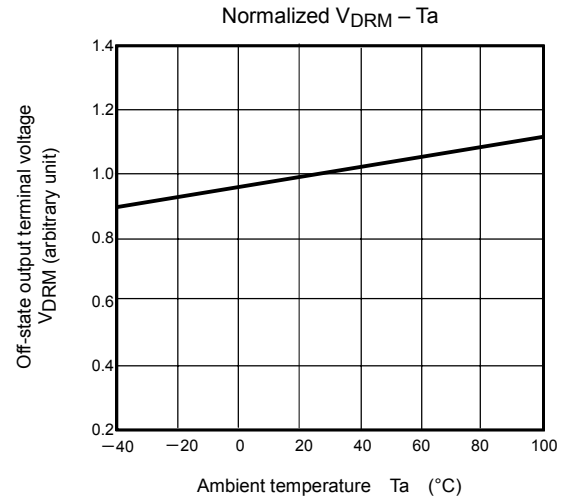
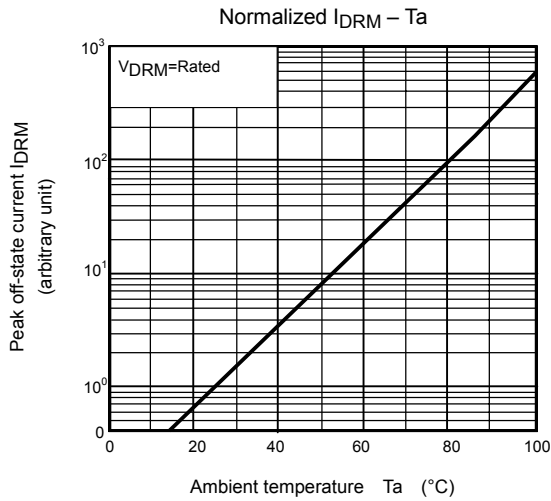
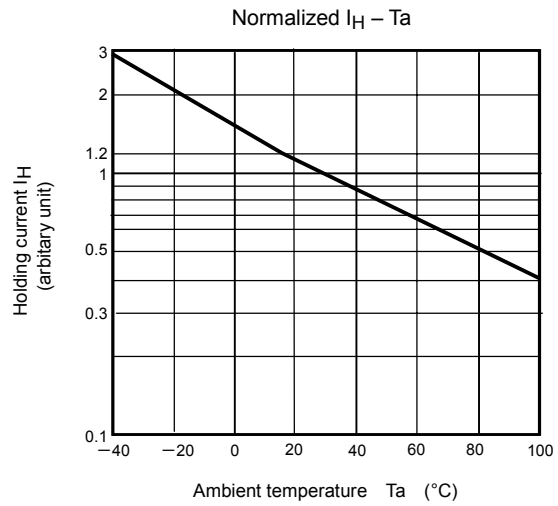
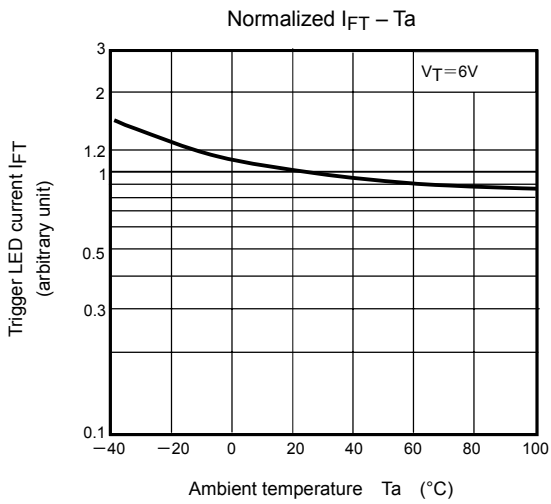
Characteristic		Symbol	Test Condition	Min.	Typ.	Max.	Unit
LED	Forward voltage	$V_F$	$I_F = 10 \text{ mA}$	1.0	1.15	1.3	V
	Reverse current	$I_R$	$V_R = 5 \text{ V}$	—	—	10	$\mu\text{A}$
	Capacitance	$C_T$	$V = 0, f = 1 \text{ MHz}$	—	30	—	pF
Detector	Peak off-state current	$I_{DRM}$	$V_{DRM} = 600 \text{ V}$	—	10	1000	nA
	Peak on-state voltage	$V_{TM}$	$I_{TM} = 70 \text{ mA}$	—	1.7	2.8	V
	Holding current	$I_H$	—	—	1.0	—	mA
	Critical rate of rise of off-state voltage	$dv / dt$	$V_{in} = 240 \text{ Vrms}, T_a = 85^\circ\text{C}$ (Fig.1)	—	500	—	$\text{V} / \mu\text{s}$
	Critical rate of rise of commutating voltage	$dv / dt(c)$	$I_T = 15 \text{ mA}, V_{in} = 60 \text{ Vrms}$ (Fig.1)	—	0.2	—	$\text{V} / \mu\text{s}$

## Coupled Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Trigger LED current	$I_{FT}$	$V_T = 6 \text{ V}$	—	5	10	mA
Capacitance input to output	$C_S$	$V_S = 0, f = 1 \text{ MHz}$	—	0.8	—	pF
Isolation resistance	$R_S$	$V_S = 500 \text{ V}, \text{R.H.} \leq 60\%$	$1 \times 10^{12}$	$10^{14}$	—	$\Omega$
Isolation voltage	$BV_S$	AC, 1 minute	2500	—	—	Vrms
		AC, 1 second, in oil	—	5000	—	
		DC, 1 minute, in oil	—	5000	—	Vdc
Turn-on time	$t_{ON}$	$V_D = 6 \rightarrow 4 \text{ V}, R_L = 100 \Omega$ $I_F = \text{rated } I_{FT} \times 1.5$	—	30	100	$\mu\text{s}$

Fig.1  $dv / dt$  test circuit





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000707EBC

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